

AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assign.	End Sem	Term work			
MVS E-101	Advance Mathematics And Numerical Analysis	4(3-1)	70	20	10			100	3 hr	hr

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks. Remaining five questions carry 12 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Candidates are required to answer all questions.

Syllabus

Theory:

Unit 1:

Numerical solution of Partial Differential Equation (PDE): Numerical solution of PDE of hyperbolic, parabolic and elliptic types by finite difference method.

Unit 2:

Integral transforms: general definition, introduction to Mellin, Hankel and Fourier transforms and fast Fourier transforms application of transforms to boundary value problems in engineering

Unit 3:

Integral equations: Conversion of Linear Differential equation (LDE) to an integral equation (IE), conversion of boundary value problems to integral equations using Green's function, solution of Integral equation, IE of convolution type, Abel's IE, Integral differential equations, IE with separable variable, solution of Fredholm Equation with separable kernels, solution of Fredholm and Volterra equations by method of successive approximations.

Unit 4:

Calculus of Variation: Functional and their Variation, Euler's equation for function of one and two independent variables, application to engineering problems.

Unit 5:

FEM: Variation functional, Euler Lagrange's equation, Variation forms, Ritz methods, Galerkin's method, discretization, finite elements method for one dimensional problem

Reference Books:

1. 1. CF Froberg, Introduction to numerical analysis.
2. SS Sastry, Introductory methods of numerical analysis
3. Krasnove, Kiselevanded Makarenho, Integral equations

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assi gn.	End Sem	Term work			
MVS E- 102	Strength Of Material And Theory Of Elasticity	4(3-1)	70	20	10			100	3 hr	0 hr

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks. Remaining five questions carry 12 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Candidates are required to answer all questions.

Syllabus

Theory:

Unit 1:

Plane Stress & Plane Strain: Plane Stress, Plane Strain, Stress and Strain at a points, Differential equations of equilibrium, constitutive relation : anisotropic materials Linear elasticity; Stress, strain, constitutive relations; Boundary conditions, Compatibility equation, stress function.

Unit 2:

Two Dimensional Problems in Rectangular Co-ordinates: Solutions by Polynomials , Saint-Venant's Principle, Determination of displacements, bending of beams, solution of two dimensional problem in Fourier series.

Unit 3:

Two Dimensional Problems in Polar Coordinates : General equations in Polar coordinates, Pure bending of curved bars, displacements for symmetrical stress distributions, bending of curved bar, stress distribution in plates with circular holes, stresses in a circular disc general solution.

Unit 4:

Analysis of stress and strain in Three Dimensions : Principal stress and strain, shearing stress and strains, elementary equation of equilibrium , compatibility conditions, problems of elasticity involving pure bending of prismatic bars.

Unit 5:

Torsion of Prismatic Bars : Torsion of prismatic bars, membrane analogy, torsion of a bar of narrow rectangular cross section, torsion of rectangular bars, solution of torsional problem, torsion of rolled section, torsion of hollow shafts and thin tubes, torsion buckling torsional flexural buckling.

Reference Books:

1. **1.** Timoshenko, S.P. , Theory of Elasticity
2. Timoshenko, S.P., Theory of Elastic Stability
3. Iyenger N.G.R., Structural Stability of Columns & Plates.

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assi gn.	End Sem	Term work			
MVS E - 103	Advance Structural Analysis	4(3-1)	70	20	10			100	3 hr	0 hr

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks. Remaining five questions carry 12 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Candidates are required to answer all questions.

Syllabus

Theory:

Unit 1:

Matrix Method (Flexibility Method) : Force methods, Basic Concepts, evaluation of flexibility, transformation, analysis of a single member of different types, transformation of single member.

Unit 2:

Applications to plane and space structures with pin joints and rigid joints, energy approach in flexibility method, effect of support displacement and transformation.

Unit 3:

Matrix Method (stiffness Method): Displacement methods, Basic concepts, Evaluation of stiffness coefficients, Direct stiffness method, energy approach in stiffness method. Code No. approach for global stiffness matrix, effect of support displacement and temperature.

Unit 4:

Symmetrical & anti-symmetrical problems, Stiffness of plane & space frames solution of problems, comparison of force and displacement methods of solution.

Reference Books:

1. C.S. Reddy , Basic Structural Analysis ,TMH, Publishers
2. W Wearer Jr. & James M. Gere, Matrix Analysis of Framed Structures, CBS Pub.
3. Rajsekeran, Sankarsubramanian, Computational structural Mechanics, PHI

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assi gn.	End Sem	Term work			
MVS E - 104	Designs Of Concrete Structures	4(3-1)	70	20	10			100	3 hr	0 hr

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks. Remaining five questions carry 12 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Candidates are required to answer all questions.

Syllabus

Theory:

Unit 1:

Earthquake and wind effects on structures, loads on structures, reinforced concrete design of flat slabs, grid floors, deep beams, design of buildings load bearing and framed structures, design of foundations, seismic analysis

Unit 2: Design of ground and elevated water tanks, design of bridge decks

Unit 3: Pre-stressed concrete: analysis and design of sections under flexure using limit state approach, anchorage zone and end block design, composite construction, introduction to statistically indeterminate pre-stressed concrete structures.

Unit 4: Silos and bunkers, Janssen's and Airy Ds theory, rectangular bunkers with sloping bottoms and with high side walls, battery of bunkers.

Reference Books:

1. Jaikrishna, Chandrasekaran, Elements of earthquake engineering.
2. Shah and Karve, Text book of reinforced concrete
3. Punamia, RCC designs

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assgn.	End Sem	Term work			
MVSE-105	Computer Aided Design	4(3-1)	70	20	10			100	3 hr	0 hr

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks. Remaining five questions carry 12 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Candidates are required to answer all questions.

Syllabus

Theory:

Unit 1: Cpp programming language: Basics of programming, loops, decisions, structures, functions, objects/ classes, arrays.

Unit 2: Overloading, inheritance, virtual functions and pointers, object oriented programming, Turbo Cpp features and programming, structure engineering problems programming.

Unit 3: Computer Aided drafting, 2-D and 3-D drawings, Introduction to CAD software, drawing of buildings.

Unit 4: Introduction to computer graphics, 3-D modeling software and analysis software

Reference Books:

1. Robert Lafore, Object oriented programming in CPP
2. E. Balaguruswamy, Programming in C
3. Syal and Gupta, Computer programming and engineering analysis.

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assgn.	End Sem	Term work			
MVSE-201	Structural Dynamics	4(3-1)	70	20	10			100	3 hr	0 hr

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks. Remaining five questions carry 12 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Candidates are required to answer all questions.

Syllabus

Theory:

Unit 1:

Single Degree of Freedom System: Free and forced vibrations, Linear Viscous Damper, Coulomb Damper: Response to harmonic excitation, rotating unbalance and support excitations, Vibration isolation and transmissibility, single degree of freedom system as vibro-meter and accelerometer, response to periodic and arbitrary excitation.

Unit 2:

Duhamel's integral. Impulse response function, Laplace transform Fourier transform methods. Frequency response function. Phase-Plane Techniques. Critical Speed of rotors. Energy methods, Rayleigh's method, Equivalent viscous damping.

Unit 3:

Two Degree of Freedom System. Matrix Formulation, Free Vibration, Beat phenomenon. Principle of damped and un-damped vibration absorbers.

Unit 4:

Multi Degree of Freedom System: Matrix formulation, stiffness and flexibility influence coefficients, eigenvalue problem, normal modes and their properties. Matrix iteration technique for eigenvalue, and eigen vectors, Free and forced vibration by modal analysis.

Unit 5:

Continuous System: Axial vibration of bar, torsion of shafts, transverse vibration of strings and bending vibration beams. Forced vibration. Normal mode method. Lagrange's equation. Approximate methods of Rayleigh-Ritz, Galerkin etc

Reference Books:

1. **1.** RW Clough, J Penzien, Dynamics of structures
2. D G Fertia, Dynamics and vibration of Structures
3. J M Biggs, Introduction to structural dynamic

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assgn.	End Sem	Term work			
MVSE-202	Fem In Structural Engineering	4(3-1)	70	20	10			100	3 hr	0 hr

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks. Remaining five questions carry 12 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Candidates are required to answer all questions.

Syllabus

Theory:

Unit 1:

Introduction to Finite Element Method: General Applicability and Description of Finite Element Method Comparison with other methods.

Unit 2:

Solution of Finite Element Method: Solution of Equilibrium Problems, Eigen value problems, propagation problems, computer implementation of Gaussian eliminations, Choleskins decomposition, Jacobins and Ranga Kutta Method.

Unit 3:

General Procedure of Finite Element Method: Descretization of the domain, Selection of Shapes, Types and Number of elements, node numbering technique, Interpolation Polynomials, their selection and derivation in terms of global and local coordinates, Convergence requirements. Formulation of Element Characteristic matrices and vectors, Variational approach. Assembly of Element matrices and Vectors and Derivation system equations, computation of element resultants.

Unit 4:

Iso-parametric Formulation: Lagrange and Hermite interpolation functions, Isoparametric Elements, Numerical Integration.

Unit 5:

Static Analysis: Formulation of equilibrium equation, Analysis of truss, Frames, Plane Stress and Plane Strain Problems Plates and Shells

Reference Books:

1. Weaver, Johnson, Finite element and structural analysis
2. HC Martin, Matrix structural analysis
3. CF Abel, CS Desai, Finite element methods

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assgn.	End Sem	Term work			
MVSE-203	Advance Concrete Technology	4(3-1)	70	20	10			100	3 hr	0hr

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks. Remaining five questions carry 12 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Candidates are required to answer all questions.

Syllabus

Theory:

Unit 1:

Cement & its properties, properties of fresh concrete compaction of concrete, curing of concrete.

Unit 2:

Properties of hardened concrete, strength characteristic, shrinkage, creep, durability, fattier.

Unit 3:

Permeability & durability of concrete is detail. Special concrete and their properties.

Unit 4:

Concrete at low & high temp. Air entrained concrete, high performance concrete

Unit 5:

Mix Design, Non destructive Testing of Concrete

Reference Books:

1. A.M. Nobile, Concrete Technology , ELBS, London
2. M.L. Gambir, Concrete Technology, Tata Mc Graw Hill Book Co.
3. Peurifoy R.L., Construction Planning Equipment & Methods, TMH\

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assgn.	End Sem	Term work			
MVSE-204	Experimental Stress Analysis	2(3-1)	70	20	10			100	3 hr	0 hr

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks. Remaining five questions carry 12 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Candidates are required to answer all questions.

Syllabus

Theory:

Unit 1:

Introduction to stress analysis by strain measurement, mechanical strain gages, Moire fringe method, Brittle coatings for stress indication, circuitry for resistance strain gages, calibrating strain gages, temperature compensation of circuitry, indication and recording equipments, unbalance of bridge systems, balanced bridge systems, reference bridge systems, constant current strain indicators, multichannel recording systems.

Unit 2:

Introduction to stress analysis by photo elasticity, optical theory, stress optical relationship, equipment and models, static stress analysis (2-D, 3-D techniques), stress analysis by photo elastic strain gages.

Unit 3:

Conditions for crack growth, fracture mechanics and strength of solids, stress and displacement fields in the vicinity of crack tip, the Griffith Orowan-Irwin concept, stable and unstable crack growth, the integral variation principle in crack theory, some more model representations, cracks in linearly elastic bodies, stress intensity factor, basic numerical methods for calculating the stress intensity factor, calculation of stress intensity factor for double cantilever beam specimen by FEM, the method of section for an approximate calculation of stress intensity factor, some material characteristics used for evaluation of crack propagation resistance.

Unit 4:

Solution of some plane and three dimensional problems, constructional crack arrest, system of cracks, stress intensity factors for some practical important cases, shell with a crack trajectory.

Reference Books:

1. Dove, Adams, Experimental stress analysis and motion
2. Heteny, Experimental stress analysis
3. Dally, Rilay, Experimental stress analysis

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assi gn.	End Sem	Term work			
MVSE-205	Theory Of Plates And Shells	4(3-1)	70	20	10			100	3 hr	0 hr

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks. Remaining five questions carry 12 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Candidates are required to answer all questions.

Syllabus

Theory:

Unit 1:

Theory of Plates: Bearing of long rectangular plates to the cylindrical surface with different edge conditions. Pure bending of plates-Differential equations of equilibrium. Theory of small deflections of laterally loads plates. Boundary conditions, momentcurvature relationship.

Unit 2:

Analysis of rectangular plates, Navierns and levy solutions, exact theory of plates, symmetrical bending of circular plates, continuous rectangular plates

Unit 3:

Special and approximate methods of theory of plates, singularities, use of influence surfaces, use of infinite integrals and transforms, strain energy methods, experimental methods.

Unit 4:

Theory of Shells: Classification of shells, Gaussian curvature, General theory of cylindrical shells, membrane theory and bending theory for cylindrical shells, long and short shells, shells, shells with and without edge beams, Fourier loading.

Unit 5:

Equation of equilibrium for shells of surface of revolution, Reduction to two differential equations of second order. Spherical shells, membrane theory for shells of double curvature-syn-elastic and anti-elastic. Cylindrical shells, Hyperbolic-parabolic shells, funicular shells.

Reference Books:

1. S Timoshenko, S Woinowasky K, Theory of Plates and Shells

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assi gn.	End Sem	Term work			
MVSE-301	Design Of Earth Quake Resistant Structures	4(3-1)	70	20	10			100	3 hr	0 hr

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks. Remaining five questions carry 12 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Candidates are required to answer all questions.

Syllabus

Theory:

Unit 1:

Seismic Strengthening of Existing Buildings: Cases histories-Learning from earthquakes, seismic strengthening procedures.

Unit 2:

Torsion & Rigidity: Rigid Diaphragms, Torsional moment, Center of mass and center of rigidity torsion effects. Lateral Analysis of Building Systems: Lateral load distribution with rigid floor diaphragms, moment resisting frames, shear walls, lateral stiffness of shear walls, shear wall-frame combination, examples.

Unit 3:

Concept of Earthquake Resistant Design: Objectives of seismic design , Ductility, Hysteric response & energy dissipation, response modifications factor, design spectrum, capacity design, classification of structural system, IS code provisions for seismic design of structures, multi-storied buildings, design criteria, P-A effects, storey drift, design examples ductile detailing of RCC structures.

Unit 4:

Seismic Design of Special Structures: Elevated liquid storage tanks, Hydrodynamic pressure in tanks, stack like structures, IS-1893 code provisions for bridges; Superstructures, sub-structures, submersible bridges, dams; Hydrodynamic effect due to reservoir, concrete gravity dams.

Unit 5:

Engineering Seismology: Basic terms, seismic waves, earthquake magnitude and intensity, ground motion, dynamic response of structures, normalized response spectra, seismic coefficients and seismic zone coefficients.

Reference Books:

1. 1. Chopra A.K., Dynamics of Structures', Theory & Applications to Earthquake Engineering, Prentice Hall India, New Delhi-1995
2. Clough & Penzien, Dynamics of Structures , McGraw Hill Book CO. Inc.
3. Paz M, Structural Dynamics, , Van Nostrand Reinhold, New York

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)
Scheme of Examination

Department: Civil Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assi gn.	End Sem	Term work			
MVSE-302	Design Of Tall Structures	4(3-1)	70	20	10			100	3 hr	0 hr

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions and carry 10 marks. Remaining five questions carry 12 marks each, one from each of the five units of the syllabus and will have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Candidates are required to answer all questions.

Syllabus

Theory:

Unit 1:

Behavior of tall structures under static and dynamic loads, model analysis.

Unit 2:

Characteristics of Wind and Earthquake Forces. Gust Factor and Karman Vortices. Approximate and Regorlons Methods of analysis for wind and Earthquake Forces.

Unit 3:

Shear walls, Frame Structures, Coupled shear walls, Tabular Structures, Ductility and reinforcement details at joint.

Unit 4:

28 Criteria for design of Chimneys, T.V. Towers and other Tall Structure.

Unit 5:

Modelling of tall structures, case studies.

Reference Books:

1. Coull, Smith, Design of tall buildings
2. Taranath, Design of tall buildings

(Board of studies)

(Academic Council)

(Registrar)

Seal

